

REMARKS

Applicants respectfully request reconsideration of the above-identified application in view of the foregoing amendments and the following remarks. Claims 1-17 are currently pending in the application.

In the Office Action of February 7, 2005, Claims 1, 2, 10, 12, 16, and 17 were rejected under 35 U.S.C. § 102(b) as being anticipated by applicants' prior art, listed as "description of prior art QUICK VISION series of vision inspection machines and QVPAK software." Claims 3-9, 11, and 13-15 were objected to as being dependent upon a rejected base claim, but were stated to be allowable if rewritten in independent form, including all of the limitations of the base claim and any intervening claims.

In response to the rejections over applicants' prior art, applicants have amended Claim 1 to emphasize certain distinctions over the cited prior art. More specifically, as amended, Claim 1 requires:

1. A method for operating a vision system to determine a set of coordinates for a plurality of edge points along an edge contour of an object, wherein the plurality of edge points *extend over a depth range greater than the depth of field of an image* of the edge contour, the method comprising:

determining the coordinates for at least a latest previous edge point in at least a latest previous edge point image;

automatically determining a next edge point XY trial location based at least partially on the XY location of the latest previous edge point;

determining a desired *next edge point source image* based on the next edge point XY trial location and *previously acquired data, wherein the next edge point source image may be different than the latest previous edge point image due to the latest previous edge point and the next edge point being in focus at different focus positions*; and

searching for the next edge point in the desired next edge point source image. (Emphasis added.)

LAW OFFICES OF
CHRISTENSEN O'CONNOR JOHNSON KINDNESS^{PLC}
1420 Fifth Avenue
Suite 2800
Seattle, Washington 98101
206.682.8100

In contrast to the claimed invention, applicants' "description of prior art QUICK VISION series of vision inspection machines and QVPAK software," describes a method that is effective for tracing an edge of a two-dimensional image that is well focused throughout, and which therefore does not extend over a depth range greater than the depth of field of an image. As shown in applicants' FIGURES 1A-1C which illustrate the prior art method, and as described in the accompanying sections of applicants' specification, on page 4, lines 21-32:

The above procedures of FIGURES 1A, 1B, and 1C are effective for automatically tracing an edge of an image in a two dimensional image that is well-focused throughout. However, in practice it is desired to provide a similar type of autotrace tool to measure edges along a relatively long contour, which may extend through two or more image frames, according to the sizes of objects that are desired to be scanned, and/or for complex shaped parts. In such cases, there are *often significant height changes along the contour*, relative to the focal plane of the imaging system. Such height changes are also called depth changes herein, because they occur in a direction generally parallel to the direction of the depth of field of the imaging system. These height/depth changes can result in loss of focus and poor edge contrast. *Poor edge contrast will cause the edge detection operations to fail or report an error—as it should for an image that cannot support reliable edge measurement.* (Emphasis added.)

In other words, while the method of applicants' "description of prior art QUICK VISION series of vision inspection machines and QVPAK software," is effective for a two-dimensional image, it does not perform well when the edge points of the edge contour extend over a depth range greater than the depth of field of an image. In accordance with applicants' claimed invention, in order to perform edge finding for such an edge contour, different edge point source images may be utilized to attempt to accurately capture different edge points that are at different depths. More specifically, in accordance with amended Claim 1, the method may be applied when "the plurality of edge points extend over a depth range greater than the depth of field of an image," and requires "determining a desired *next edge point source image* based on the next edge point XY trial location and *previously acquired data, wherein the next edge point source*

image may be different than the latest previous edge point image due to the latest previous edge point and the next edge point being in focus at different focus positions." This is in contrast to the prior art method, which does not determine a desired next edge point source image based on the next edge point XY trial location and previously acquired data, wherein the next edge point source image may be different than the latest previous edge point image due to the latest previous edge point and the next edge point being in focus at different focus positions.

Claims 2, 10, 12, 16, and 17, which were also rejected under 35 U.S.C. § 102(b), depend from independent Claim 1 and so are believed to be allowable for the same reasons discussed above. In addition, some of these claims are believed to include additional patentable distinctions. For example, Claim 2 requires:

2. The method of Claim 1, wherein *the previously acquired data comprises a plurality of images acquired at a plurality of corresponding focus positions* and the step of determining a desired next edge point source image comprises *selecting the one of the plurality of images that is determined to have the best focus in the vicinity of the next edge point XY trial location*. (Emphasis added.)

Thus, Claim 2 requires that the previously acquired data that is utilized for determining the next edge point source image includes a plurality of images acquired at a plurality of corresponding focus positions, and the determining of the next edge point source image includes selecting the image that has the best focus. This is in contrast to applicants' "description of prior art QUICK VISION series of vision inspection machines and QVPAK software," which is directed to a two-dimensional auto edge tracing method, which does not utilize a plurality of images acquired at different focus positions in order to determine the next edge point source image.

CONCLUSION

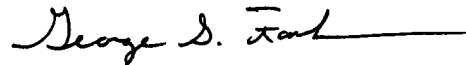
In view of the foregoing amendments and remarks, applicants respectfully request reconsideration of the above-identified application and respectfully submit that Claims 1-17 are

LAW OFFICES OF
CHRISTENSEN O'CONNOR JOHNSON KINDNESS^{PLLC}
1420 Fifth Avenue
Suite 2800
Seattle, Washington 98101
206.682.8100

in condition for allowance. Therefore, applicants respectfully request that the claims be allowed and that the case be passed to issue. Should any further questions remain, the Examiner is invited to contact applicants' attorney at the telephone number listed below.

Respectfully submitted,

CHRISTENSEN O'CONNOR
JOHNSON KINDNESS^{PLLC}



George S. Farber
Registration No. 41,497
Direct Dial No. 206.695.1757

I hereby certify that this correspondence is being deposited with the U.S. Postal Service in a sealed envelope as first class mail with postage thereon fully prepaid and addressed to Mail Stop Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on the below date.

Date: Aug. 5, 2005 Lori A. Lewis

GSF:lal

LAW OFFICES OF
CHRISTENSEN O'CONNOR JOHNSON KINDNESS^{PLLC}
1420 Fifth Avenue
Suite 2800
Seattle, Washington 98101
206.682.8100